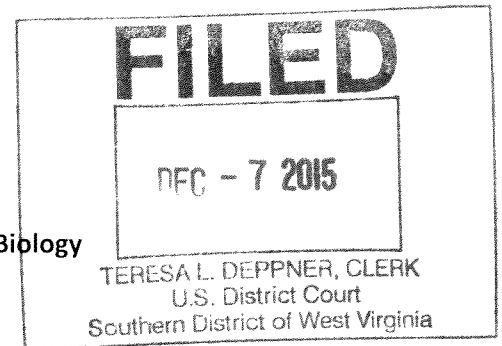


FOIA – BOARDTREE CONSENT DECREE
 CIVIL ACTION NO. 2:10-cv-1199
 U.S. DISTRICT COURT FOR THE S.D. W. Va
Assessment and Decision of the Special Master for Biology
 1 December 2015



I have reviewed the analyses of both the Defendants (submitted to me on 20 October, 2015) and Plaintiffs rebuttal (submitted to me on 3 November, 2015). My review of these data is to ultimately determine if Fola is in legal compliance with the Consent Decree, or is reasonably likely to attain compliance within a short period of time (not to exceed six months). I understand that my authority in this matter does not include modifying the Consent Decree in anyway. This includes addressing the defendants request for an additional year to achieve compliance. Simply put, compliance as defined in the Consent Decree is, “at a minimum, that Fola has achieved, and is likely to continue to achieve a passing score for biological integrity using the WVDEP-approved SCI” and “an acute WET score that does not exceed 0.3 Toxic Unit, and a chronic WET score that does not exceed 1.0 Toxic Unit”. The data provided by both parties appears to be a complete and up-to-date account of the information necessary for an effective review and assessment.

- I. Initial evaluations. I find the assessment of baseline and pre-mining conditions of Boardtree Branch provided to me by the Defendants to be inaccurate and misleading. For example I note that in Appendix B and Table 16 the site at Boardtree Branch is station #6, not station #5 as noted by the Defendants in their assessment. The benthic fauna of this location in 1977 was dominated by intolerant taxa including the stoneflies *Pteronarcys* and *Peltopterla*, as well as a heptageniid mayfly *Stenonema vicarium*. Also it is clear from these data that Boardtree Branch in 1977 is perennial, not intermittent, as suggested by the Defendants, as all of these taxa are rheophilic organisms – needing flowing water to exist. I agree with Plaintiffs that a direct comparison of the pre-mining condition of Boardtree Branch, using these data collection protocols, is difficult at best.
Evaluation following Plaintiff memo dated 17 November, 2015. Plaintiffs realized the error of their initial analyses and submitted for my review a corrected version of these data. This evaluation of these data is based on the corrected version. Despite the corrected values the Defendants used a taxa richness comparison between pre-mining and current conditions. In my opinion this comparison is not appropriate because of collection efficiency and a good possibility that taxonomic resolution has improved between surveys (1977 and contemporary). The list of sensitive to conductivity based on the WV XC95 values was included in the Plaintiffs response and it does contain four EPT taxa. I studied the list of taxa collected from single-habitat, post-restoration surveys and noted the following; first the abundance of these sensitive taxa was very low (mostly only a single organism) and two, many were collected only during the spring (April) collections. One organism found in a 200 count sample is less than 1% of the total number of organisms and in my opinion insignificant, and the fact that most were collected during spring samples may indicate that these organisms are relict taxa from many of the spring seeps in the catchment. I agree

with Plaintiffs argument concerning the increase of WVSCI scores (particularly at Fola 2), in essence that the increased scores reflect metric variability and not a true improvement in the biological integrity of Boardtree Branch.

- II. Despite the fact that the cladoceran *Ceriodaphnia dubia* is commonly used in standard toxicity testing laboratories nationwide, I question the use of this organism as a surrogate for native fauna during both chronic and acute toxicity testing at Boardtree Branch. Plaintiffs note the results in a paper by Kunz et al. (2013), which I also reviewed as part of my assessment. Kunz and his colleagues note that the selection of the laboratory test species is critical for relating major ion toxicity to field data. He also notes that reconstituted water from Boardtree and Winding Shoals Creeks were toxic to *Lampsilis siliquoidea* (a freshwater mussel), *Hyaella azteca* (an amphipod) as well as *Ceriodaphnia dubia* at conductivities of 500 to 2400 $\mu\text{S}/\text{cm}$. Defendants note correctly that acute and chronic WET scores do not exceed 0.3 or 1.0 TUs respectively, for the most part. However, exceptions did occur in 2014 (Appendix C). In my opinion the toxicity data as reported upon by the Defendants and conscripted by the Consent Decree are accurate (for the most part), but I do have misgivings on the use of these data as surrogates for Boardtree Branch.

- III. It is clear that Fola has not attained a passing score using the WVDEP – SCI of 68 points. The question is can this score be reliably and consistently attained within the next six months. The Defendants point out correctly that the time for restoration effectiveness is very short – only two years. In my opinion this is unrealistic; however it is clearly stated in the Consent Decree that these are the conditions of this project. I have visited the site on three occasions following restoration and inspected the habitat improvements during this time. It appeared to me that the construction team did an exemplary job of construction. It is very likely that the improved habitat noted following restoration may have accounted for some improvements in the WVSCI. However both parties agree that Boardtree Branch remains ionically stressed (Defendants note in their assessment that conductivity levels in the stream “frequently exceed 3,000 $\mu\text{S}/\text{cm}$ ”) and the organisms that dominate this feature are tolerant to these conditions (in particular Hydropsychid caddisfly larvae). Emphasis has been given to conductivity as the only problem in both reports; however, there are many other elements of concern in Boardtree Branch that should also be considered during discussions as potential cumulative factors. Stream degradation is the result of complex additive and interactive factors as noted in Merriam et al. (2015). Based on these data and observations, in my opinion an additional six months of stream improvements such as planting large-caliper trees or reseeding the fauna with Habitubes (see below) will not improve the WVSCI significantly.

- IV. Most of the Boardtree Branch watershed has been buried from mountaintop mining fill and therefore sources for recolonization of aquatic insects from within this catchment have been eliminated. Some recolonization may occur when adult insects fly in from neighboring catchment, but this source of recolonization will take much longer than drift from upstream

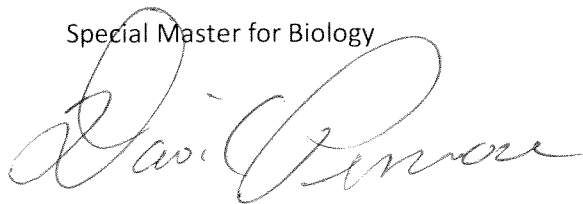
sources. Therefore the use of 'restocking' or 'seeding' programs, such as the Habitube is a plausible concept. My hope would be that this technique could supply a source of insects that could be relocated and colonize Boardtree Branch. The Habitubes were installed in January and June of 2014 and a review of the benthic insects' presence/absence data from Boardtree Branch did note the occurrence of several taxa not collected during preconstruction surveys. See collection from FOLA 2 on 15 April, 2014 from which small numbers of one stonefly taxa (*Amphinemura*) and three caddisfly taxa (*Diplectrona*, *Pycnopsyche* and *Rhyacophila*) were collected. Whether these taxa were found in Boardtree Branch because of the restoration efforts or the installation of the Habitubes is conjecture at this point. However, these four taxa were found in the Habitube collections in a neighboring stream prior to the 'seeding' of Boardtree Branch. Unfortunately these taxa were not collected again and my assumption is that these non-resident taxa were eliminated because of unfavorable water quality conditions. Despite the good intentions of this effort it appears that poor water quality is affecting the outcome.

- V. Other pre- and post-restoration observations. It's also interesting to note the increase in the number of elmids following restoration. Only one elmid beetle taxa (*Optioservus*) was collected from Boardtree Branch before restoration and five elmid beetle taxa following restoration (*Optioservus*, *Dubiraphia*, *Microcylloepus*, *Promoresia* and *Stenelmis*). All Elmidae have very high 95% extirpation coefficients (except *Promoresia*) as noted in Table 1, Appendix A supplied by the Plaintiffs. Finally I find it interesting to note that during the pre-restoration surveys the Chironomidae were identified to genus level, whereas during the post-restoration surveys only family level was used for identification. This is despite the fact that immediately following restoration the Chironomidae were by far the most dominant group of benthic insects. These are only interesting observations at this point and do not affect my final decision.

SUMMARY AND DECISION. Based on the reviews provided to me by both the Defendants and Plaintiffs and the facts that 1) a summary of pre-mining conditions of Boardtree Branch, which were compared inappropriately to current conditions, were erroneous (the revision of these data, which were dated 18 November, did not provide sufficient information to alter my opinion as noted above), 2) the questionable use of *Ceriodaphnia dubia* as a surrogate for native fauna, 3) consistently low WVSCI scores with the likelihood of passing scores being observed in the next six months unlikely and 4) reseeded of Boardtree Branch appeared to fail due to poor water quality, I therefore, find in favor of the Plaintiffs. Based on these observations Fola will need to continue to comply with the Consent Decree (sections 40 and 41) and begin implementation of advanced water treatment.

I have to best of my ability memorialized all oral contact with both parties in this matter and preserved all communications and records of communications with the parties.

Special Master for Biology

A handwritten signature in black ink, appearing to read "David Buckwalter", written in a cursive style.

1 December 2015

References:

- Kunz, James L., Justin M. Conley, David B. Buckwalter, Teresa J Norberg-King, Nile E. Kemble, Ning Wang and Christopher G. Ingersoll. 2013. USE OF RECONSTITUTED WATERS TO EVALUATE EFFECTS OF ELEVATED MAJOR IONS ASSOCIATED WITH MOUNTAINTOP COAL MINING ON FRESHWATER INVERTEBRATES. *Environmental Toxicology and Chemistry*. Vol. 32. No. 12, pp 2826-2835.
- Merriam, Eric R., J. Todd Petty, Michael PI Strager, Aaron E. Maxwell and Paul F. Ziemkiewicz. 2015. LANDSCAPE-BASED CUMULATIVE EFFECTS MODELS FOR PREDICTING STERAM REPOSE TO MOUNTAINTOP MINING IN MULTISTRESSOR APPALACHIAN WATERSHEDS. *Freshwater Science*. Vol. 34. No. 3, pp 1006-1019.